

# SERVICE MANUAL

DIGITAL SYNTHESIZER TUNER

## SANSUI TU-D33X TU-D33XL



### CAUTION

1. Parts identified by the  $\Delta$  symbol on the schematic diagram and the parts list are critical for safety. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

**Sansui**

SANSUI ELECTRIC CO., LTD.

### •SPECIFICATIONS

#### TU-D33X

##### FM Section

Tuning range ..... 88 to 108 MHz  
Usable sensitivity  
Mono IHF ..... 10.8 dBf (1.9  $\mu$ V : T100)  
DIN ..... 0.95  $\mu$ V

##### 50 dB quieting sensitivity

Mono ..... 16.0 dBf  
Stereo ..... 36.0 dBf

##### Signal to noise ratio at 65 dBf

Mono ..... 78 dB  
Stereo ..... 72 dB

##### Distortion at 65 dBf

Mono ..... less than 0.08% at 1,000 Hz  
Stereo ..... less than 0.12% at 1,000 Hz

##### Alternate channel selectivity (at 400 kHz)

..... 60 dB  
..... 1.0 dB

##### Capture ratio

..... 45 dB

##### Image response ratio

..... 75 dB

##### Stereo separation

..... 40 dB at 1,000 Hz

##### Frequency response

Stereo ..... 30 to 15,000 Hz, +0.3 dB, -0.8 dB

##### Antenna input impedance

..... 300 ohms balanced  
..... 75 ohms unbalanced

##### AM Section

Tuning range ..... 530 to 1,600 kHz

Usable sensitivity ..... 50 dB/m (316  $\mu$ V/m)

Signal to noise ratio ..... 50 dB

Image response ratio ..... 45 dB at 1,000 kHz

##### Others

##### Output voltage and impedance

..... 775 mV/2.2 kohms

Power requirements ..... 120/220/240V, 50/60 Hz

For U.S.A. and Canada ..... 120V (60 Hz)

Power consumption ..... 9 watts

Dimensions ..... 430 mm (16-15/16")W

..... 46 mm (1-13/16")H

..... 227 mm (8-15/16")D

Weight ..... 2.3 kg (5.1 lbs) net

..... 2.9 kg (6.4 lbs) packed

#### TU-D33XL

##### FM Section

Tuning range ..... 88 to 108 MHz

##### Usable sensitivity

Mono IHF ..... 10.8 dBf (1.9  $\mu$ V : T100)  
DIN ..... 0.95  $\mu$ V

##### 50 dB quieting sensitivity

Mono ..... 16.0 dBf  
Stereo ..... 36.0 dBf

##### Signal to noise ratio at 65 dBf

Mono ..... 78 dB  
Stereo ..... 72 dB

##### Distortion at 65 dBf

Mono ..... less than 0.08% at 1,000 Hz  
Stereo ..... less than 0.12% at 1,000 Hz

##### Alternate channel selectivity (at 400 kHz)

..... 60 dB  
..... 1.0 dB

##### Capture ratio

..... 45 dB

##### Image response ratio

..... 75 dB

##### Stereo separation

..... 40 dB at 1,000 Hz

##### Frequency response

Stereo ..... 30 to 15,000 Hz, +0.3 dB, -0.8 dB

##### Antenna input impedance

..... 300 ohms balanced  
..... 75 ohms unbalanced

##### AM (MW, LW) Section

Tuning range ..... MW: 530 to 1,600 kHz

..... LW: 153 to 360 kHz

Usable sensitivity ..... MW: 50 dB/m (316  $\mu$ V/m)

..... LW: 60 dB/m at 250 kHz

Signal to noise ratio (MW) ..... 50 dB

Image response ratio (MW) ..... 45 dB at 1,000 kHz

##### Others

##### Output voltage and impedance

..... 775 mV/2.2 kohms

Power requirements ..... 220/240V, 50/60 Hz

Power consumption ..... 9 watts

Dimensions ..... 430 mm (16-15/16")W

..... 46 mm (1-13/16")H

..... 227 mm (8-15/16")D

Weight ..... 2.3 kg (5.1 lbs) net

..... 2.9 kg (6.4 lbs) packed

\* Design and specifications subject to changes without notice for improvements.

\* In order to simplify the explanation illustrations may sometimes differ from the originals.

## CAUTION

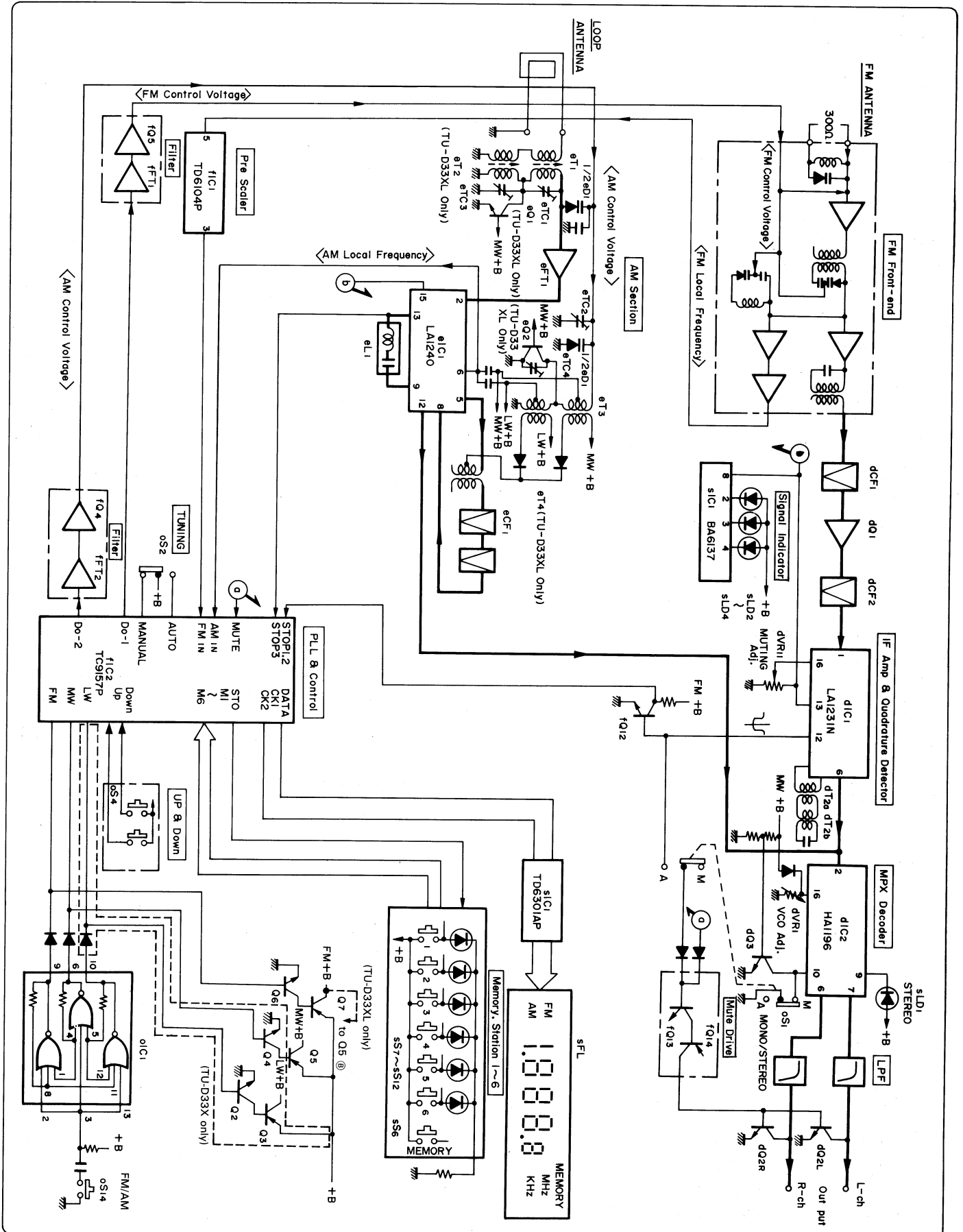
1. The symbols, UL, CSA, SA, BS, UK, AS and XX on the parts list and the schematic diagram mean followings respectively.  

UL.....	Manufactured for U.S.A market. (Underwriters Laboratories approved model.)
CSA .....	Manufactured for Canadian market.
SA.....	Manufactured for South African market.
BS, UK .....	Manufactured for United Kingdom market.
EU .....	Manufactured for European market.
AS.....	Manufactured for Australian market.
XX.....	Standard Version.
NON MARK .....	Common Parts.
2. Some printed circuit boards are not supplied as the assembled.  
To separate these in this service manual, the stock No's are not indicated at the ends of the board names. However, the individual parts on the circuit boards are provided by orders.
3. Since some of capacitors and resistors are omitted from parts lists in this service manual, refer to the Common Parts List for capacitors & resistors, which was issued on February 1983.
4. Abbreviations in this service manual are as follows.

## • Abbreviations List

C.R.	: Carbon Resistor	E.B.L.	: Low Leak Bi-Polar
S.R.	: Solid Resistor		Electrolytic Capacitor
Ce.R.	: Cement Resistor	Ta.C.	: Tantalum Capacitor
M.R.	: Metal Film Resistor	F.C.	: Film Capacitor
F.R.	: Fusing Resistor	M.P.	: Metalized Paper Capacitor
N.I.R.	: Non-Inflammable Resistor	P.C.	: Polystyrene Capacitor
A.R.	: Array Resistor	G.C.	: Gimmic Capacitor
C.C.	: Ceramic Capacitor	A.C.	: Array Capacitor
C.T.	: Ceramic Capacitor,	V.R.	: Variable Resistor
	Temperature Compensation	S.V.R.	: Semi Variable Resistor
E.C.	: Electrolytic Capacitor	SW.	: Switch
E.L.	: Low Leak Electrolytic	Chip R.:	: Chip Resistor
	Capacitor	Chip C.:	: Chip Capacitor
E.B.	: Bi-Polar Electrolytic		
	Capacitor		

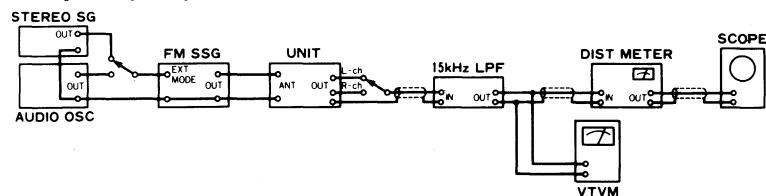
# 1. BLOCK DIAGRAM



## 2. ADJUSTMENTS

### 2-1. FM Adjustment (See Top View on Page 11)

#### 1) FM IF & Reference Frequency Adjustment (See Parts Location on page 6, 7)



Note: 1. SELECTOR..... FM      2. FM MUTING/MODE..... OFF/MONO

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	IF Coil Adj.	98MHz ANT Input 20dBf (14.8dB), 1kHz (100% MOD.), FM SSG	ANT terminal 300Ω	Between Point(A) (dVR11, F-4600) & Earth DC Volt Meter	IFT Coil (Front-end)	Max. DC Volt	
2.	Discriminator Coil Adj. In case of using Genescope	1 No Input	—	Between Test Point(B) & Point(C) (F-4600) DC Volt Meter	dT1 (F-4658)	DC 0V ± 30mV	•Repeat procedures as stated in subject 1 & 2. 
		2 Output 60dB, Genescope	Point(D) (JW51)	Between Point(E) (JW13 or 2 & Earth)	dT2 (F-4658)	Steep linearity of S curve. Make symmetrical S curve.	
	Discriminator Coil Adj. In case of using Dist meter	1 No Input	—	Between Test Point(B) & Point(C) (F-4600) DC Volt Meter	dT1 (F-4658)	DC 0V ± 30mV	•Repeat procedures as stated in subject 1 & 2.
		2 98MHz ANT Input 65dBf (59.8dB), 1kHz (100% MOD.), FM SSG	ANT terminal 300Ω	•Output Terminal VTVM/SCOPE & Dist Meter	dT2 (F-4658)	Min. THD	

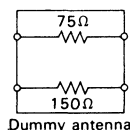
#### •ADJUSTMENT FOR FM

There are two kind in indication of FM SSG output attenuator

1. Attenuator with marking of 75Ω open ..... open indication type.
2. Attenuator with marking of 75Ω load or close ..... load or close indication type.

FM SG output level in this FM adjustment are described as open indication type.  
To feed FM signal, a dummy antenna circuit as Fig. 2-1 must be connected between FM SG output and ANT terminal (300Ω) of the unit.

Fig. 2-1



- The following table shows relations among FM SG attenuator indication (dB), available power ratio (dBf) and antenna terminal voltage (dB/μV) in each indication type.

	FM SG Attenuator Indication	Available Power Ratio	Antenna Terminal Voltage
Open indication type	0 dB 66 dB	-0.8 dBf 65.2 dBf	-6 dB/μV 60 dB/μV
Load or close indication type	0 dB 60 dB	5.2 dBf 65.2 dBf	0 dB/μV 60 dB/μV

#### 2) FM STEREO Adjustment

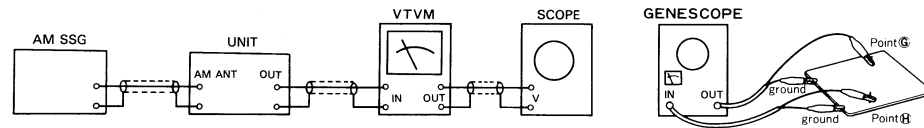
1. SELECTOR..... FM      2. FM MUTING/MODE..... AUTO

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	PLL VCO Adj.	98MHz ANT Input 65dBf (59.8dB), FM SSG, Pilot 19kHz (9% MOD.), R or L MODE 1kHz + Pilot (100% MOD.), STEREO SG	ANT terminal 300Ω	Stereo Indicator	dVR1 (F-4659)	Light indicator	Adjust the dVR1 within center of light level
	PLL VCO Adj. In case of using Freq.	98MHz ANT Input 65dBf (59.8dB), FM SSG, No MOD.	Same as above	Between Point(F) (Pin 9 of dIC2) & Earth Freq. Counter	dVR1 (F-4659)	19kHz ± 50Hz	
2.	Muting level Adj.	98MHz ANT Input 22dBf (16.8dB), FM SSG, Pilot 19kHz (9% MOD.), L or R MODE 1kHz + Pilot (100% MOD.) STEREO SG.	Same as above	Stereo indicator OUTPUT L-CH or R-CH, VTVM & SCOPE	dVR11 (F-4600)	Stereo indicator turns ON or Output Signal comes out	



## 2-2. AM Adjustment (See Top View on Page 11)

### 1) AM IF Adjustment & MW (AM) Tuning Adjustment



Note: 1) SELECTOR..... AM (TU-D33X)/MW (TU-D33XL)

2) Connect AM loop antenna to AM antenna terminal.

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	IF Coil Adj.	Genescope Output 0dB	PointⒸ (JW4 or 21) (F-4600)	Between PointⒹ (eC26, F-4657) & Earth	eT5, eL1 (F-4657)	Max, Waveform	•Before this adjustment, remove the F-4659 circuit board. Refer to "how to remove it" on page 4.
2.	522kHz (9kHz step) or 520kHz (10kHz step) Tuning Adj.	No Input	—	Between PointⒿ (eR2, F-4600) & Earth DC Volt Meter	eT3 (F-4600)	1V ± 0.1V	•Repeat procedures as stated in subject 2 & 3.
3.	1610kHz (10kHz step) or 1611kHz (9kHz step) Tuning Adj.	No Input	—	Same as above	eTC2 (F-4600)	8V ± 0.1V	
4.	603kHz (9kHz step) or 600kHz (10kHz step) RF Adj.	603kHz (or 600kHz) ANT Input 30dB 400Hz (30% MOD.), AM SSG	ANT terminal	Output Terminal L-CH or R-CH VTVM & SCOPE	eT1 (F-4600)	Max. Output	
5.	1404kHz (9kHz step) or 1400kHz (10kHz step) RF Adj.	1404kHz (or 1400kHz) ANT Input 30dB 400Hz (30% MOD.), AM SSG	Same as above	Same as above	eTC1 (F-4600)	Max. Output	

### 2) LW Tuning Adjustment (TU-D33XL only)

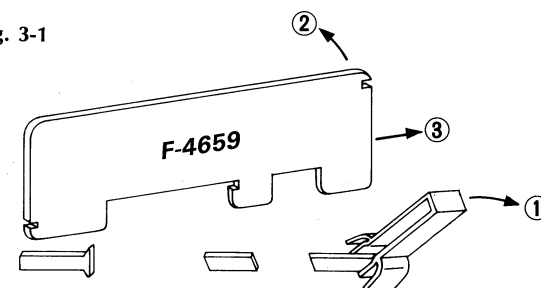
Note: SELECTOR..... LW

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	153kHz Tuning Adj.	No Input	—	Between PointⒿ (eR2, F-4600) & Earth DC Volt Meter	eT4 (F-4600)	1V ± 0.1V	•Repeat procedures as stated in subject 1 & 2.
2.	360kHz Tuning Adj.	No Input	—	Same as above	eTC4 (F-4600)	8V ± 0.1V	
3.	170kHz RF Adj.	170kHz ANT Input 30dB 400Hz (30% MOD.), AM SSG	ANT terminal	Output Terminal L-CH or R-CH VTVM & SCOPE	eT2 (F-4600)	Max. Output	
4.	300kHz RF Adj.	300kHz ANT Input 30dB 400Hz (30% MOD.), AM SSG	Same as above	Same as above	eTC3 (F-4600)	Max. Output	

## 3. HOW TO REMOVE F-4659 CIRCUIT BOARD

- 1) Remove bonnet and bottom plate.
- 2) Remove tension wire.
- 3) Unsolder the F-4659 circuit board connection points.
- 4) Pull the F-4659 circuit board holder into the arrow direction①.
- 5) Pull the circuit board into the arrow direction②.
- 6) Pull out the circuit board into the arrow direction③.

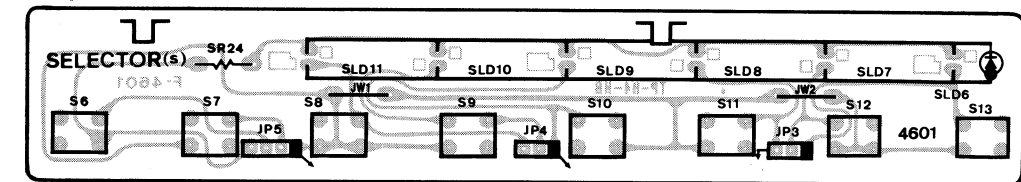
Fig. 3-1



## 4. PARTS LOCATION & PARTS LIST

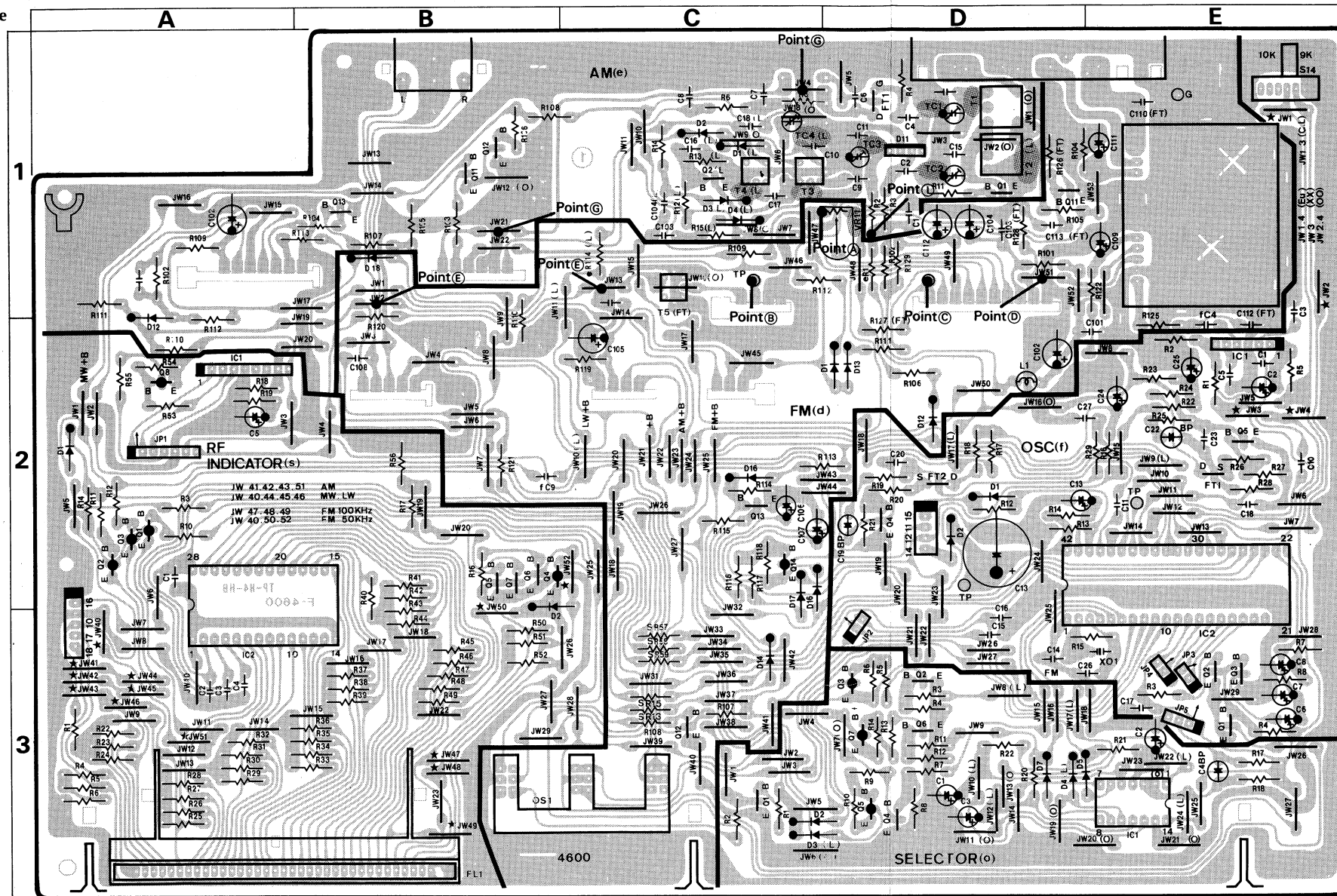
### 4-1. F-4601 Preset Memory Circuit Board

Component Side



## 4-5. F-4600 Main Circuit Board (Stock No. TU-D33X = 00814701) (Stock No. 00815705 = TU-D33XL)

Component Side



## Parts List

Parts No.	Stock No.	Description
dZ1	48120800	FM Frontend Pack
•Transistor		
dQ11	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
dQ12	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
dQ13	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
dQ14	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
•Diode		
dD12	03117600	1S2473T77
	or 46086000	1S1588TP-3
dD13	03117600	1S2473T77
	or 46086000	1S1588TP-3
dD14	03117600	1S2473T77
	or 46086000	1S1588TP-3

Parts No.	Stock No.	Description
dD15	03117600	1S2473T77
	or 46086000	1S1588TP-3
dD16	03117600	1S2473T77
	or 46086000	1S1588TP-3
dD17	03117600	1S2473T77
	or 46086000	1S1588TP-3
dD18	03117600	1S2473T77
	or 46086000	1S1588TP-3
dC108	46695700	0.016μF 50V F.C.
dL1	46204200	Inductor 3.3μH
dVR11	07241300	10kΩ(B) S.V.R., Muting adj.
•Transistor		
eQ1	46540801	2SC2878 (TU-D33XL)
eQ2	46540801	2SC2878 (TU-D33XL)
eQ11	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
eQ12	46367101	2SC2603 (TU-D33XL)
	or 46367301	2SC2458 (TU-D33XL)
	or 46391901	2SC2785 (TU-D33XL)

Parts No.	Stock No.	Description
eQ13	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
ΔdR101	08922100	22Ω 1/2W N.I.R.
ΔdR119	00117800	18Ω 1/4W F.R.
ΔdR129	08922100	22Ω 1/2W N.I.R.
•FET		
eFT1	46393000	2SK192A-Y
	or 46393001	2SK192A-GR
•Diode		
eD1	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
eD2	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
eD3	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
eD4	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
eD11	46146300	Voltage V.C. Diode KV1236Z2

Parts No.	Stock No.	Description
•Diode		
eD12	03117600	1S2473T77
	or 46086000	1S1588TP-3
ΔeR109	08922900	100Ω 1/2W N.I.R.
eTC1	46162800	20pF Trimmer Capacitor
	or 46437400	20pF Trimmer Capacitor
eTC2	46162800	20pF Trimmer Capacitor
	or 46437400	20pF Trimmer Capacitor
eTC3	46162800	20pF Trimmer Capacitor (TU-D33XL)
	or 46437400	20pF Trimmer Capacitor (TU-D33XL)
eTC4	46162800	20pF Trimmer Capacitor (TU-D33XL)
	or 46437400	20pF Trimmer Capacitor (TU-D33XL)
eT1	46394600	AM ANT Coil
eT2	46397900	AM RF Coil (TU-D33XL)
eT3	48074300	AM RF Coil
eT4	48074400	LW OSC Coil (TU-D33XL)
•Transistor		
fQ1	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
fQ2	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
fQ3	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
fQ4	46367101	2SC2603 (TU-D33XL)
	or 46367301	2SC2458 (TU-D33XL)
	or 46391901	2SC2785 (TU-D33XL)
fQ5	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
•FET		
fFT1	46643501	2SK163-K2
	or 46643502	2SK163-L1
	or 46643601	2SK117-Y
	or 46643602	2SK117-GR
fFT2	46643501	2SK163-K2 (TU-D33XL)
	or 46643502	2SK163-L1 (TU-D33XL)
	or 46643601	2SK117-Y (TU-D33XL)
	or 46643602	2SK117-GR (TU-D33XL)
•IC		
fIC1	07225000	TD6104P
fIC2	46397400	TC9157P
	or 48127900	TC9147BP
	or 48128000	TC9157AP
		(TU-D33X-EU, TU-D33XL)
		(TU-D33X-XX,UL,CSA,SA,AS)
fxO1	07237700	Quartz Element NC-18C
•Diode		
fD1	03117600	1S2473T77
	or 46086000	1S1588TP-3
fD2	03117600	1S2473T77
	or 46086000	1S1588TP-3
fc12	46579700	4700μF 6.3V E.L.
fc19	08451900	3.3μF 50V E.B. (TU-D33XL)
fc22	08451700	1μF 50V E.B.
•Transistor		
oQ1	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
oQ2	46367101	2SC2603 (TU-D33XL)
	or 46367301	2SC2458 (TU-D33XL)
	or 46391901	2SC2785 (TU-D33XL)
oQ3	46367001	2SA1115 (TU-D33XL)
	or 46367201	2SA1048 (TU-D33XL)
	or 46392001	2SA1175 (TU-D33XL)

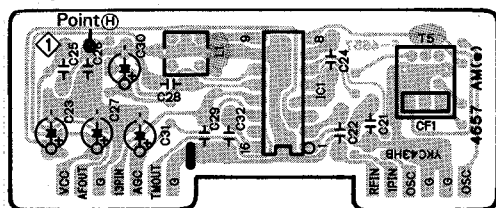
## Parts List &lt;F-4600&gt;

Parts No.	Stock No.	Description
oQ4	46367101	2SC2603 (TU-D33XL)
	or 46367301	2SC2458 (TU-D33XL)
	or 46391901	2SC2785 (TU-D33XL)
oQ5	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
oQ6	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
oQ7	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
•IC		
oIC1	46426900	μPD4025BC
	or 48055000	MSM4025BRS
	or 48122900	HD14025BP
	or 48123000	TC4025BP
•Diode		
oD2	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
oD3	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
oD4	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
oD5	03117600	1S2473T77
	or 46086000	1S1588TP-3
oD7	03117600	1S2473T77
	or 46086000	1S1588TP-3
oC4	08450800	3.3μF 16V E.B.
oS1	48069500	Push SW., FM MODE, TUNING, FM NOISE CANCELLER
oS14	46177200	Slide SW., AM STEP (TU-D33X-XX)
oZ1	46547300	4P Terminal Board, Antenna
oZ2	48148500	2P Terminal Board, OUTPUT
•Transistor		
sQ1	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
sQ2	46367001	2SA1115 (TU-D33XL)
	or 46367201	2SA1048 (TU-D33XL)
	or 46392001	2SA1175 (TU-D33XL)
sQ3	46367001	2SA1115 (TU-D33XL)
	or 46367201	2SA1048 (TU-D33XL)
	or 46392001	2SA1175 (TU-D33XL)

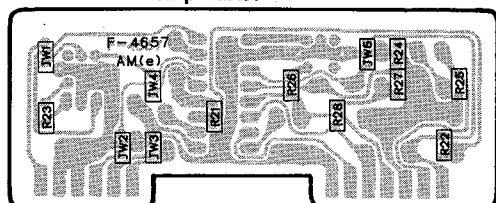
Parts No.	Stock No.	Description
sQ4	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
sQ5	46367101	2SC2603
		(TU-D33XL, TU-D33X-SA,EU,AS)
	or 46367301	2SC2458
		(TU-D33XL, TU-D33X-SA,EU,AS)
	or 46391901	2SC2785
		(TU-D33XL, TU-D33X-SA,EU,AS)
sQ6	46367101	2SC2603
		(TU-D33XL, TU-D33X-SA,EU,AS)
	or 46367301	2SC2458
		(TU-D33XL, TU-D33X-SA,EU,AS)
	or 46391901	2SC2785
		(TU-D33XL, TU-D33X-SA,EU,AS)
sQ7	46367101	2SC2603
		(TU-D33XL, TU-D33X-SA,EU,AS)
	or 46367301	2SC2458
		(TU-D33XL, TU-D33X-SA,EU,AS)
	or 46391901	2SC2785
		(TU-D33XL, TU-D33X-SA,EU,AS)
sQ8	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
•IC		
sIC1	46197200	BA6137
sIC2	46410100	TD6301AP
•Diode		
sD1	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
sD2	03117600	1S2473T77
		(TU-D33XL, TU-D33X-SA,EU,AS)
	or 46086000	1S1588TP-3
		(TU-D33XL, TU-D33X-SA,EU,AS)
sFL1	48056000	FL. Display Tube FG78L8GR
•LED		
sLD6	46176900	TLS-123
	or 46470200	SEL2210S
sLD7	46176900	TLS-123
	or 46470200	SEL2210S
sLD8	46176900	TLS-123
	or 46470200	SEL2210S
sLD9	46176900	TLS-123
	or 46470200	SEL2210S
sLD10	46176900	TLS-123
	or 46470200	SEL2210S
sLD11	46176900	TLS-123
	or 46470200	SEL2210S

## 4-6. F-4657 AM IF Circuit Board (Stock No. TU-D33X = 00814201) (Stock No. 00815205 = TU-D33XL)

## Component Side



## Pattern Side &lt;Chip Parts&gt;



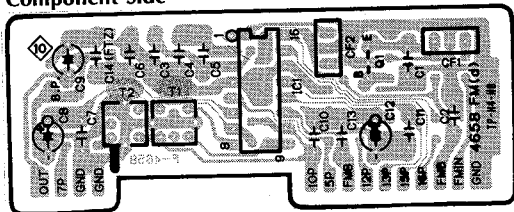
## Parts List

Parts No.	Stock No.	Description
•IC		
eIC1	03608000	LA1240
eJW1	46741100	Cross Conductor (Chip)
eR21	46747600	1kΩ 1/8W Chip R.
eR22	46745200	100Ω 1/8W Chip R.
eR23	46744400	47Ω 1/8W Chip R.
eR24	46747600	1kΩ 1/8W Chip R.
eR25	46752400	100kΩ 1/8W Chip R.
eR26	46745200	100Ω 1/8W Chip R.
eR27	46750000	10kΩ 1/8W Chip R.
eR28	46750000	10kΩ 1/8W Chip R.
eCF1	48069900	Ceramic Filter (TU-D33XL)
eT5	48069800	Ceramic Filter CFLZ450 (TU-D33X)
	48072000	AM IF Coil (TU-D33XL)
eL1	46369600	AM IF Coil

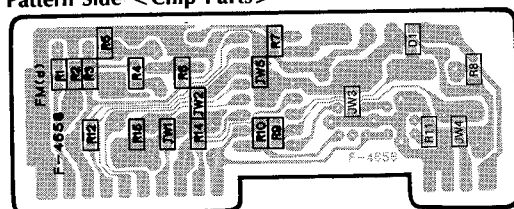
#### 4-7. F-4658 FM IF Amp. Circuit Board

(Stock No. 00814301)

Component Side



Pattern Side &lt;Chip Parts&gt;



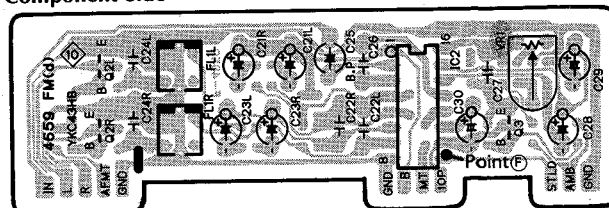
Parts List

Parts No.	Stock No.	Description
•Transistor dQ1	46393201	2SC2786
•IC dIC1	07191200	LA1231N
•Diode dD1	46852000	RLS-73
dJW1	46741100	Cross Conductor (Chip)
dR1	46745800	180Ω 1/8W Chip R.
dR2	46747000	560Ω 1/8W Chip R.
dR3	46747600	1kΩ 1/8W Chip R.
dR4	46745200	100Ω 1/8W Chip R.
dR5	46747400	820Ω 1/8W Chip R.
dR6	46746600	390Ω 1/8W Chip R.
dR7	46746400	330Ω 1/8W Chip R.
dR8	46752400	100kΩ 1/8W Chip R.
dR9	46750800	22kΩ 1/8W Chip R.
dR10	46750400	15kΩ 1/8W Chip R.
dR11	46748800	3.3kΩ 1/8W Chip R.
dR12	46750000	10kΩ 1/8W Chip R.
dR14	46750000	10kΩ 1/8W Chip R.
dR15	46749600	6.8kΩ 1/8W Chip R.
dC9	08450900	4.7μF 16V E.B.
dCF1	46202500	Ceramic Filter SFE10.7MS2 (RED)
dCF2	46202500	Ceramic Filter SFE10.7MS2 (RED)
dT1	48072100	FM IF Coil
dT2	48072200	FM IF Coil

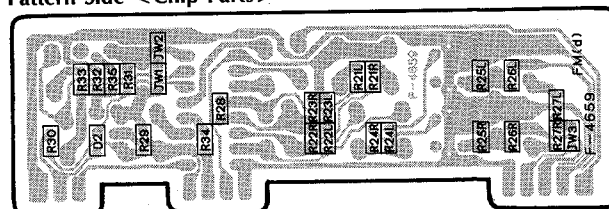
#### 4-8. F-4659 FM MPX Circuit Board

(Stock No. 00814401)

Component Side



Pattern Side &lt;Chip Parts&gt;



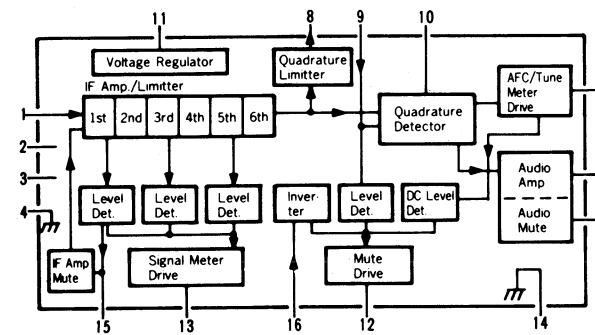
Parts List

Parts No.	Stock No.	Description
•Transistor dQ2 dQ3	46391901 46391901	2SC2785 2SC2785
•IC dIC2	03603200	HA1196
•Diode dD2	46852000	RLS-73
dJW1	46741100	Cross Conductor (Chip)
dR21	46750200	12kΩ 1/8W Chip R.
dR22	46751600	47kΩ 1/8W Chip R.
dR23	46751000	27kΩ 1/8W Chip R.
dR24	46748400	2.2kΩ 1/8W Chip R.
dR25	46749400	5.6kΩ 1/8W Chip R.
dR26	46747600	1kΩ 1/8W Chip R.
dR27	46748800	3.3kΩ 1/8W Chip R.
dR28	46753000	180kΩ 1/8W Chip R.
dR29	46749200	4.7kΩ 1/8W Chip R.
dR30	46750800	22kΩ 1/8W Chip R.
dR31	46750800	22kΩ 1/8W Chip R.
dR32	46750800	22kΩ 1/8W Chip R.
dR33	46747600	1kΩ 1/8W Chip R.
dR34	46750800	22kΩ 1/8W Chip R.
dR35	46753200	220kΩ 1/8W Chip R.
dC22	46282000	1500pF 50V F.C.
dC24	46531300	5600pF 50V F.C.
dC25	08451200	2.2μF 25V E.B.
dFL1	48072300	Low Pass Filter
dVR1	07241300	10kΩ(B) S.V.R., VCO adj.

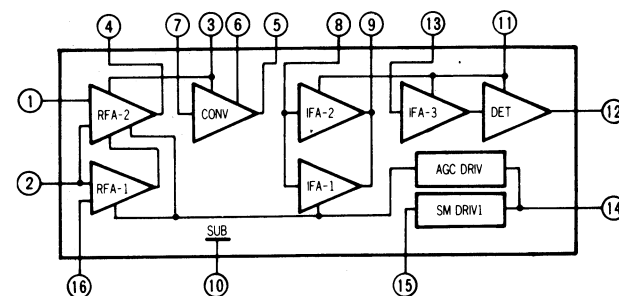


## 5. INTERIOR BLOCK DIAGRAM OF IC & TERMINAL FUNCTION OF TC9157P

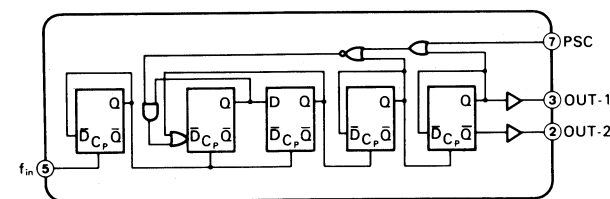
### •LA1231N (FM IF AMP & Quadrature Detector IC)



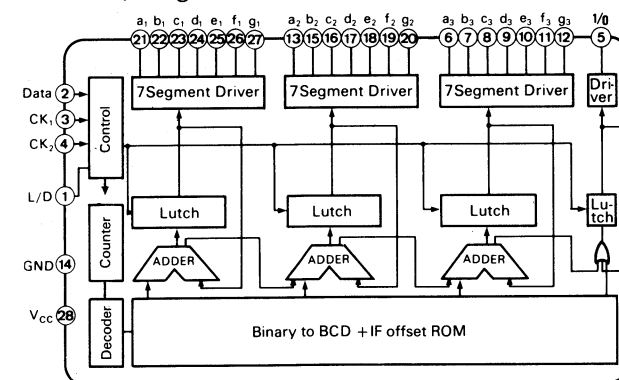
### •LA1240/HA1197 (AM Tuner IC)



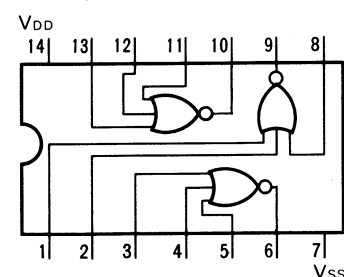
### •TD6104P (Prescaler IC)



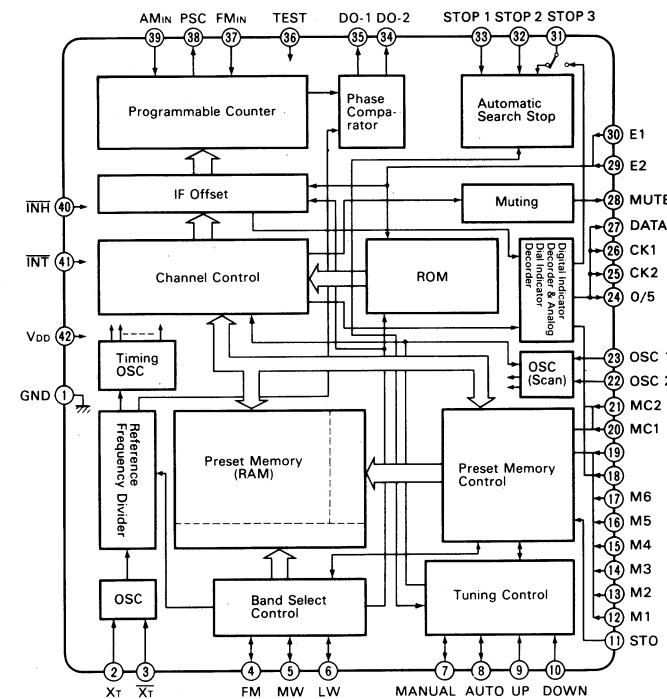
### •TD6301P (7 Segment Decoder IC)



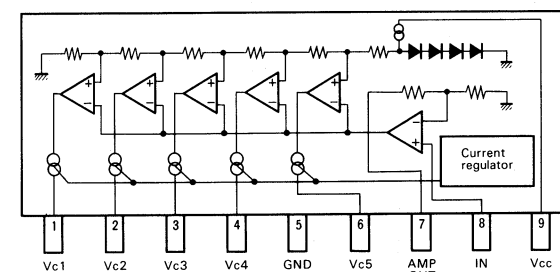
### •TC4025BP/μPD4025BP/MSM4025BRS/HD14025BP (Triple NOR IC)



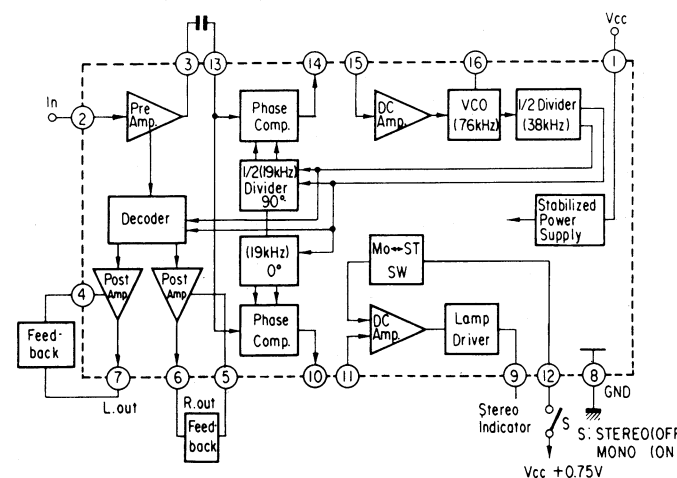
### •TC9157P (PLL & Control IC)



### •BA6137 (L.E.D. Drive IC)



### •HA1196 (MPX IC)



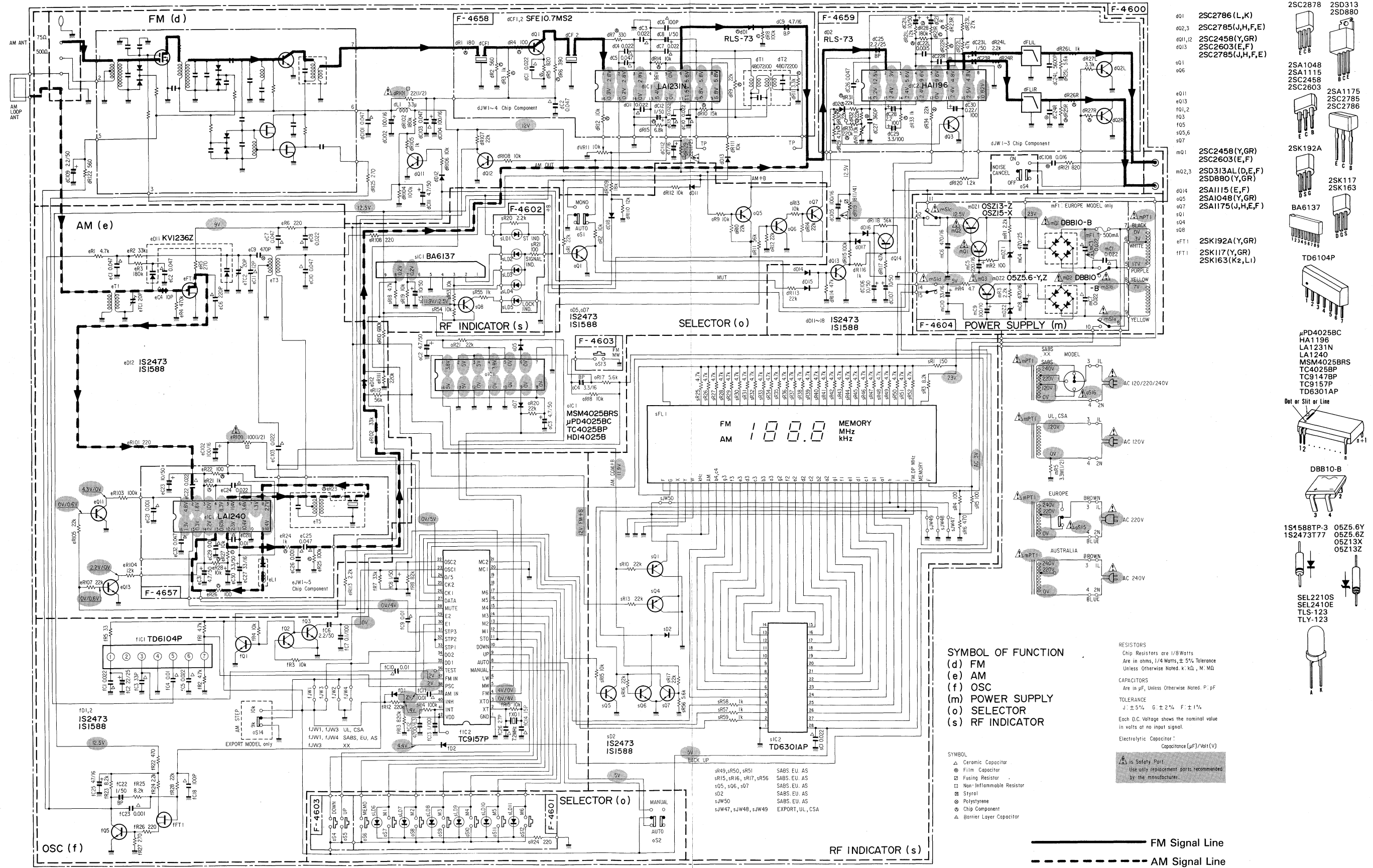
### •Terminal Function of LSI-TC9157P

Pin No.	Pin Name	Functions
2,3	X <sub>T</sub> X <sub>T</sub>	Terminals to connect a quartz oscillator for generating a reference frequency.
4, 5, 6	FM MW LW	Terminals to input a signal for switching FM/MW/LW band.
7, 8	MANUAL AUTO	Terminal to input a signal for switching the manual operation to automatic search operation or vice versa in the UP/DOWN tuning mode. "H": Automatic, "L": Manual
9, 10	UP DOWN	Terminals to input a signal from the tuning key. * In manual operation: When the key is kept depressed for 0.3 sec or more in one-step/one-push step feeding, the operation changes to fast forwarding; when the key is released, the operation stops at the next stop. In this case, even if there is a station on the way, the station is neglected. * In automatic search operation: When the key is depressed once, the automatic search operation starts and stops automatically after having selected the desired station.
11	STO	Terminal to input a signal for storing data in the preset memory unit. Input/output terminal in which a LED driver is provided. * When depressing the STO key, the STO lamp comes on. Next, when any desired memory No. key is depressed, the data on receiving frequency is written into the memory unit and the STO lamp goes off. * When the STO key is depressed and the memory No. key is not depressed, the frequency data is released automatically.
12, 17	M1 M6	Terminals to input a signal for designating memory address. Input/output terminals in which a LED driver is provided. * Terminals M <sub>1</sub> to M <sub>6</sub> designate the addresses of FM memory unit in FM receiving and the addresses of AM memory unit in AM receiving. * When depressing the STO key and any desired station key of M <sub>1</sub> to M <sub>6</sub> , the data is written into the memory unit. * When depressing any desired station key of M <sub>1</sub> to M <sub>6</sub> , the data is read out.
22	OSC 2	Terminal to connect a condenser and resistor for the oscillator for determining the speed of AM automatic search operation.
23	OSC 1	Terminal to connect a condenser and resistor for the oscillator for determining the speed of FM automatic search operation.
24, 25, 26, 27	O/5 CK1 CK2 DATA	Terminals to output the data for displaying the received frequency digitally and a timing signal. The data fed to the driver TD6301P for displaying a static frequency and the timing signal are outputted once only when the frequency is updated in such case as when the power supply is tuned on, the UP/DOWN key is depressed, the automatic scanning operation is made, the data are read out of the memory unit, or FM/AM is switched. In the ordinary receiving state, this terminal is fixed to a "L" level. * O/5: For displaying 50 kHz during FM receiving in Europe. * Data: Binary coded frequency data and receiving band. * CK-1, CK-2: Initialize and transfer clock signals.

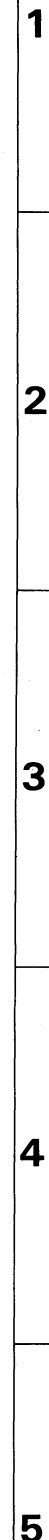
Pin No.	Pin Name	Functions
28	MUTE	Terminal to output the muting signal. The terminal is kept in "L" level in ordinary state, and in "H" level in muting.
29, 30	E2 E1	Terminals to input a signal for selecting destinations of Japan, USA, and Europe. * Inputs of terminals E <sub>1</sub> and E <sub>2</sub> are read and latched in INH=L state and in FM/AM switching.
31	STOP 3	When a IF450 kHz signal is applied to this terminal during automatic search operation, the scanning operation stops.
32	STOP 2	Terminal to input a signal for performing the automatic search stop. When a "H" level signal is applied to STOP 1 and this terminal during automatic search operation, the scanning operation stops.
33	STOP 1	Terminal to input a signal for slowing the speed of scanning operation. When a "H" level signal is applied to this terminal during automatic search operation, the speed of scanning operation halves.
34, 35	D <sub>0</sub> -2 D <sub>0</sub> -1	Terminals to output a signal from a phase comparator. These terminals can be used for FM and AM, separately, since the same signal is outputted from the terminals D <sub>0</sub> -1 and D <sub>0</sub> -2 at the same time.
36	TEST	Terminal to input a signal of test mode. Test mode in "H" level.
37	FMIN	Terminal to input a signal from the FM programmable counter. An amplifier is provided in the input.
38	PSC	Terminal to output a signal for controlling the Prescaler IC of TD6104P.
39	AMIN	Terminal to input a signal from the AM programmable counter. An amplifier is provided in the input.
40	INH	Terminal to input a signal of inhibit. Ordinary operation in "H" level; inhibit operation in "L" level.
41	INT	Terminal to input an initialize signal. This terminal changes to H level in the ordinary operation and to L level in the initialize operation.
42, 1	VDD GND	Power supply terminals. 5V±0.5V.

## 6. SCHEMATIC DIAGRAM 6-1. TU-D33X

\* Design and specifications subject to change without notice for improvement.  
 \* La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.  
 \* Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.



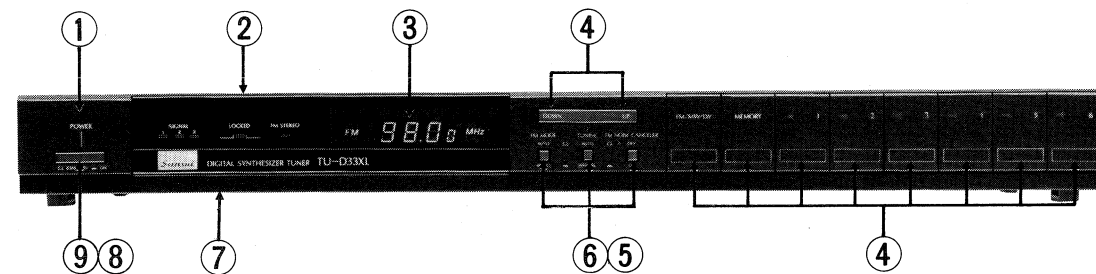
- \* Design and specifications subject to change without notice for improvement.
- \* La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
- \* Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.



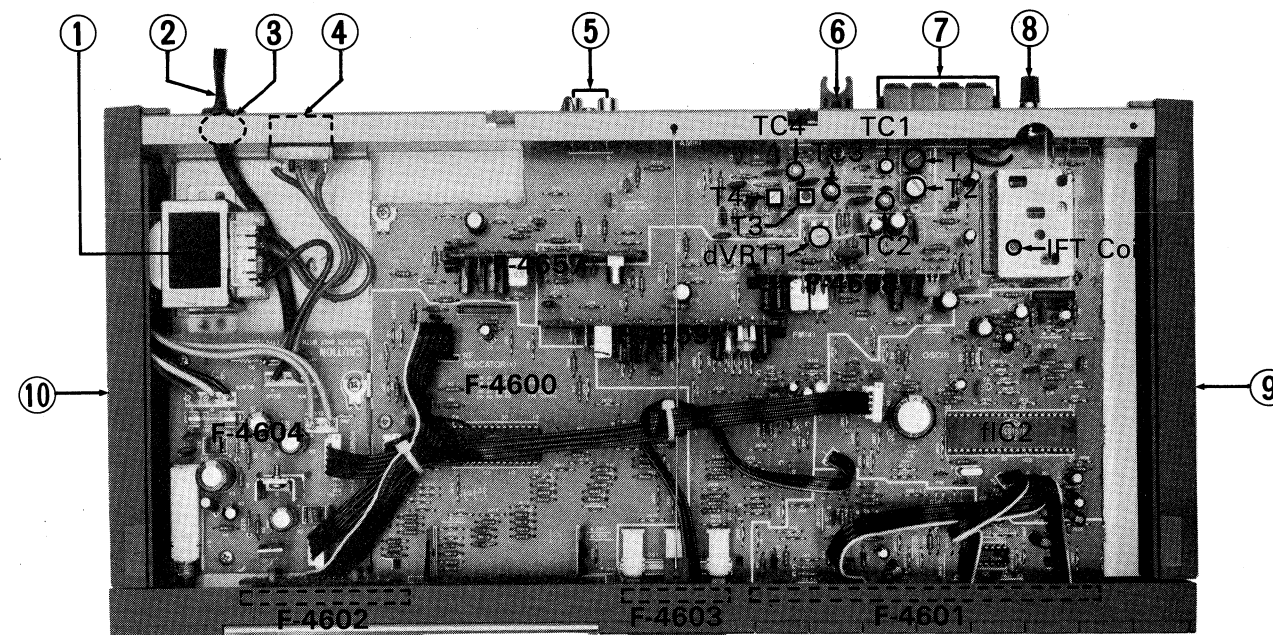


## 7. OTHER PARTS

### 7-1. Front View



### 7-2. Top View



Parts List &lt;Front View&gt;

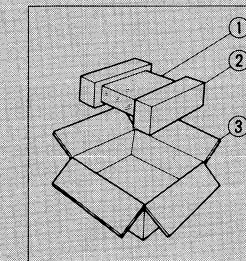
Parts No.	Stock No.	Description
1	47606100	Front Panel Ass'y (TU-D33X)
	47606300	Front Panel Ass'y (TU-D33XL)
2	47602100	Bonnet
3	48056000	FL. Display Tube, FG78L8GR
4	46708100	Push SW., UP, DOWN, FM/AM, MEMORY, 1, 2, 3, 4, 5, 6,
5	07917300	Knob, FM MODE, TUNING, FM NOISE CANCELLER
6	48069500	Push SW., FM MODE, TUNING, FM NOISE CANCELLER
△ 7	48069600	Voltage Selector (TU-D33X-XX,SA)
8	47601400	Knob, POWER
△ 9	46412500	Push SW., POWER (TU-D33X-XX,UL,CSA)
△	46412400	Push SW., POWER (TU-D33X-SA,EU,AS, TU-D33XL)

Parts List &lt;Top View&gt;

Parts No.	Stock No.	Description
△ 1	15017801	Power Transformer (TU-D33X-XX,SA)
△	15017802	Power Transformer (TU-D33X-UL,CSA)
△	15017805	Power Transformer (TU-D33X-EU,AS, TU-D33XL)
△ 2	38004700	Power Supply Cord (TU-D33X-XX,UL,CSA,SA)
△	38004500	Power Supply Cord (TU-D33X-EU, TU-D33XL-EU)
△	38004300	Power Supply Cord (TU-D33XL-B)
△	07204200	Power Supply Cord (TU-D33X-AS)
3	39106000	Strain Relief (TU-D33X-XX,UL,CSA,SA)
	39104900	Strain Relief (TU-D33X-EU,AS, TU-D33XL)
△ 4	07204700	Slide SW., voltage selector (TU-D33X-EU,AS, TU-D33XL)
5	48148500	2P-Terminal, OUTPUT
6	07193200	Antenna Holder
7	46547300	Antenna Terminal
8	22301510	GND Terminal
9	47538000	Side Panel (Right)
10	47537900	Side Panel (Left)

## 8. PACKING LIST

Parts No.	Stock No.	Description
1	07599500	Vinyl Cover
2	47178200	Styrofoam Packing
3	47601000	Carton Case (TU-D33X)
	47601800	Carton Case (TU-D33XL)



## 9. ACCESSORY LIST

Stock No.	Description
38103200	Pin Plug Cord
46051700	FM Antenna
48069700	AM Loop Antenna
46958100	Operating Instruction (TU-D33X)
46958200	Operating Instruction (TU-D33XL)

## 10. NOTES

When the user moves to different channel step area on FM or AM, the following arrangements must be performed.

	Sets Applicable to	Channel Step Frequency		fIC1 Input Port Level		Cross Conductor (F-4600)				9k/10k Switch oS14
		AM	FM	E <sub>1</sub>	E <sub>2</sub>	jw1	jw3	jw4	jw2	
I	South Africa	9 kHz	50 kHz	L	L	—	—	○	○	None
	Europe	9 kHz	50 kHz	H	L	○	—	○	—	None
	America	9 kHz	100 kHz	L	H	—	○	—	○	None
	America	10 kHz	100 kHz	H	H	○	○	—	—	None
II	Sets which 9k/10k Switch is installed	9 kHz	100 kHz	L	H	—	○	—	—	9 kHz
		10 kHz	100 kHz	H	H	—	○	—	—	10 kHz

•Note: 1) L=Low Level, H=High Level, ○=Connect, —=Remove  
 2) oS14=AM 9k/10k Switch on F-4600  
 3) Remove the 9k/10 kHz switch only when a user operates the set (II) in 50 kHz channel step (I)

**Sansui**

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(SM1-186)

Printed in Japan (740420M) &lt;Stock No. 36499600&gt;